THERMAL ENERGY

The energy associated with the random motion of atoms and molecules.

Thermal energy is what we commonly think of as "heat." It is the energy associated with the movement of molecules and therefore is a type of kinetic energy. Thermal energy can be transferred from one object to another and such processes occur on a stove when we cook food. Many forms of energy can be converted to thermal energy. In fact most all types of energy conversions create thermal energy as a by-product. Burning fossil fuels (coal, natural gas, oil, gasoline) converts chemical energy to thermal energy and can be used to heat homes and cook food.

Thermal energy can also be converted to mechanical energy in an automobile engine or be used to provide power for industrial machinery. Thermal energy is often used to create steam from water and used to force the rotation of turbine systems used to create electrical energy.

Further considerations:

Thermal energy is dependent on the total amount of molecules in motion. There is a difference between the concept of thermal energy and "heat." While a cup of coffee can be quite "hot" with a very high temperature it only has a limited amount of thermal energy. A bathtub of warm water has far more thermal energy than the cup of coffee due to its increased volume. The total mass and volume of material "heated" is very important when considering thermal energy. Temperature values alone do not accurately represent the thermal energy of a given system.